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Two New Species of Inquilinous *Monomorium* from North America (Hymenoptera: Formicidae)

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ABSTRACT

The ant, *Monomorium talbotae*, new species, is described from Michigan. This species is compared briefly with *Monomorium pergandei*. Dealate and alate females and males were found in three colonies of a host species which is the *M. minimum* of Talbot (1975). This new ant is apparently a workerless, permanent social parasite.

Similarly, another workerless, permanent social parasite, *M. inquilinum*, is described from Mexico and compared with *M. pergandei* and *M. talbotae*. One female was discovered in a nest of what is, or is closely related to, *M. cyaneum*.

Both inquilinous species are compared with their hosts and a key is provided for the separation of the inquilinous *Monomorium*. The taxonomic relationships between hosts and inquilines are also discussed.

A lectotype is designated for *M. pergandei*.

INTRODUCTION

Although several species of parasitic *Monomorium* have been described from around the world, only two species have been described as inquilines of *Monomorium* (*minutum* group) in North America. Since Ettershank (1966) synonymized *M. metoecus* (Brown and Wilson, 1957) with *M. minimum* because of the existence of a worker caste (Wilson and Brown, 1958), *M. pergandei* (Emery, 1892, described further 1895) has been the only known inquilinous *Monomorium* in North America.

Recently, I received specimens of two new species of inquilinous *Monomorium*: *M. talbotae* from Michigan (courtesy of Dr. Mary Talbot) and *M. inquilinum* from Mexico (courtesy of Ms. Margaret Thayer at the Museum of Comparative Zoology). *Monomorium talbotae* is known from the holotype, allotype, and eight paratypes. *Monomorium inquilinum* is known only from the holotype.

Monomorium talbotae NEW SPECIES

Holotype female and allotype male.—
MICHIGAN: Livingston Co.; E. S.

George Reserve; 30 June 1966; M. Talbot (66-13). Holotype and allotype are deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Holotype lacks left forewing and right hindwing. Paratypes are in the following collections: M. B. DuBois personal collection (2 females); Snow Entomological Museum, University of Kansas, Lawrence (1 female); M. Talbot personal collection (4 females, 1 male).

Female

Diagnosis.—Similar to *M. pergandei* in general morphology and lack of a worker caste, but differing in the following features: clypeus scarcely emarginate, lacking teeth; propodeum, petiole and postpetiole as in Figure 1; no depression on first gastral tergum.

Similar to host in general morphology but differing in the following features: worker caste lacking; clypeus scarcely emarginate; mandible with two teeth; length less than 3 mm.

Description.—Habitus, in general, like queens of other *Monomorium* (Fig. 1). Total length including mandibles 2.28 mm in alcohol. HEAD: Length 0.45 mm; width 0.43 mm; surface smooth and shining with pits (representing insertions of setae) prominent; mandible with two teeth; maxillary palp 1-segmented; labial palp 1-segmented; clypeus scarcely emarginate, lacking teeth; antenna 12-segmented with a weakly developed 3-segmented club. Head and mandibles light brown, antennae light yellow. ALITRUNK: Length 0.68 mm; pronotal width 0.33 mm; surface smooth and shining with pits prominent on pronotum; propodeal spines absent. Alitrunk light brown, legs light brown except tibiae and tarsi which are light yellow. Wings as in Figure 1. PETIOLE: Length 0.21 mm; width 0.16 mm; height 0.23 mm; pedunculate; dorsal surface of

node evenly convex with no trace of emargination; both anterior and posterior surfaces of node evenly covered with erect setae of uniform height; sides of petiole smooth. Color light brown. POSTPETIOLE: Length 0.13 mm; width 0.23 mm; height 0.18 mm; dorsal surface of node evenly convex with no trace of emargination; sides of postpetiole punctate. Color light brown. GASTER: No depression on first gastral tergum; surface of gaster smooth and shining with pits visible on first tergum. Color light brown.

Worker

Unknown and apparently non-existent, as in *M. pergandei*.

Male

Description.—Habitus, in general, like males of other *Monomorium*. Total length including mandibles 2.18 mm in alcohol. HEAD: Length 0.43 mm; width 0.43 mm; antenna with 12 segments; sculpture, palps and color as in holotype. Mandible reduced, similar to female. ALITRUNK: Length 0.68 mm; pronotal width 0.29 mm; sculpture, propodeum, and color as in holotype. Wings as in Figure 1. PETIOLE: Length 0.20 mm; width 0.15 mm; height 0.16 mm; pedunculate; dorsal surface, pilosity, sculpture and color as in holotype. POSTPETIOLE: Length 0.13 mm; width 0.23 mm; height 0.15 mm; pilosity, sculpture and color as in holotype.

Variation

The following measurements, in millimeters, were taken from the holotype, seven paratype females and one paratype male. All measurements were made in alcohol. Variation within each character measured for the females is expressed as the mean (range). The actual measurements for the male specimen are given in

brackets following the measurements of the females. HEAD: Length 0.44 (0.40-0.48) [0.39]; width 0.40 (0.39-0.42) [0.42]. ALITRUNK: Length 0.68 (0.63-0.72) [0.63]; pronotal width 0.32 (0.27-0.33) [0.30]. PETIOLE: Length 0.18 (0.10-0.21) [0.16]; width 0.16 (0.15-0.18) [0.18]; height 0.20 (0.18-0.23) [0.19]. POST-PETIOLE: Length 0.11 (0.09-0.14) [0.10]; width 0.20 (0.19-0.23) [0.21]; height 0.16 (0.15-0.21) [0.15]. TOTAL LENGTH: 2.32 (2.10-2.55) [2.33].

Derivatio nominis

This species is named after Dr. Mary Talbot, who discovered it.

Habitat

From notes by M. Talbot: "A high, dry field where vegetation was not dense and small patches of bare sandy soil were numerous. Grasses were mostly *Poa compressa* and *Aristida* sp. A variety of scattered forbs included *Lespedeza capitata*, *Liatris aspersa*, *Rumex acetosella*, and *Solidago* spp. Patches of *Polytrichum piliferum* moss were large and frequent, and the red-tipped lichen, *Cladonia cristallina* var. *vestita*, was characteristic."

Comparison of *M. talbotae* with its Host

Wilson (1971, p. 374-5) cites a set of morphological and behavioral characteristics which are found in some combination in all species of inquilinous ants. Several of these traits can be recognized in *M. talbotae* (numbers of traits correspond to those of Wilson): 1. worker caste is lost; 4. female and male are reduced in size; 8. although the arrangement of veins is similar to that of the host, many of these "veins" are represented as the absence of microtrichia (dashed lines in figures), indicating a reduction in venation; 9. mouthparts are reduced, with the mandible losing

two teeth and the labial and maxillary palps losing one segment each; 13. petiole and postpetiole are thickened; 14. a spine is formed on the ventral surface of the postpetiole; and 16. cuticular sculpturing is reduced. One additional character which is probably associated with small size is the reduction in size and complexity of the male genitalia.

In spite of the above modifications, *M. talbotae* appears to be closely related to its host for the following reasons. 1. Although the wing veins are reduced in *M. talbotae*, their placement is nearly identical with the placement of veins in the host's wings. 2. The reduced male genitalia are more similar to those of the host than to any other North American *Monomorium*. The structure of sternum VIII is correspondingly similar. Sternum IX is also similar, although it has been reduced to such an extent that it resembles the corresponding structure in most North American *Monomorium*. 3. The metanotum is present as a small bump in side view (Fig. 1). This is true for both *M. talbotae* and its host. However, the metanotum is shaped differently in *M. inquilinum* (Fig. 2). 4. The propodeum is of a similar rounded shape in both *M. talbotae* and its host (Fig. 1). This can be compared with the flattened outline of the propodeum in *M. inquilinum* (Fig. 2). 5. The suture across the mesothorax is evenly curved and slightly thickened at the posterior end in both *M. talbotae* and its host (Fig. 1). 6. The pilosity of *M. talbotae* is more similar to its host than to *M. inquilinum*.

Measurements of host queen.—The following measurements were taken from a queen of the *M. minimum* of Talbot (1975) collected from the E. S. George Reserve. Total length including mandibles 5.20 mm in alcohol. HEAD: Length 0.75 mm; width 0.8 mm. ALITRUNK: Length 1.45 mm; pronotal width 0.7 mm. PETIOLE: Length 0.50 mm; width 0.30

mm; height 0.38 mm. POSTPETIOLE: Length 0.25 mm; width 0.38 mm; height 0.33 mm.

Measurements of host male.—The following measurements were taken from a male of the *M. minimum* of Talbot (1975) collected from the E. S. George Reserve. Total length including mandibles 4.86 mm in alcohol. HEAD: Length 0.72 mm; width 0.81 mm. ALITRUNK: Length 1.59 mm; pronotal width 0.78 mm. PETIOLE: Length 0.51 mm; width 0.27 mm; height 0.36 mm. POSTPETIOLE: Length 0.21 mm; width 0.31 mm; height 0.33 mm.

Monomorium inquilinum NEW SPECIES

Holotype label data.—Estado de Mexico: Highway 57 (between Mexico City and Queretaro), km 127 (measured from Mexico City); 9 August 1965; High Desert; Cornell University Mexico Field Party. W. L. Brown (pers. comm.) indicated that his field notes record the locality as 83 km south of Queretaro. Holotype is deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Wings lacking on holotype although specimen appears to have possessed them when younger.

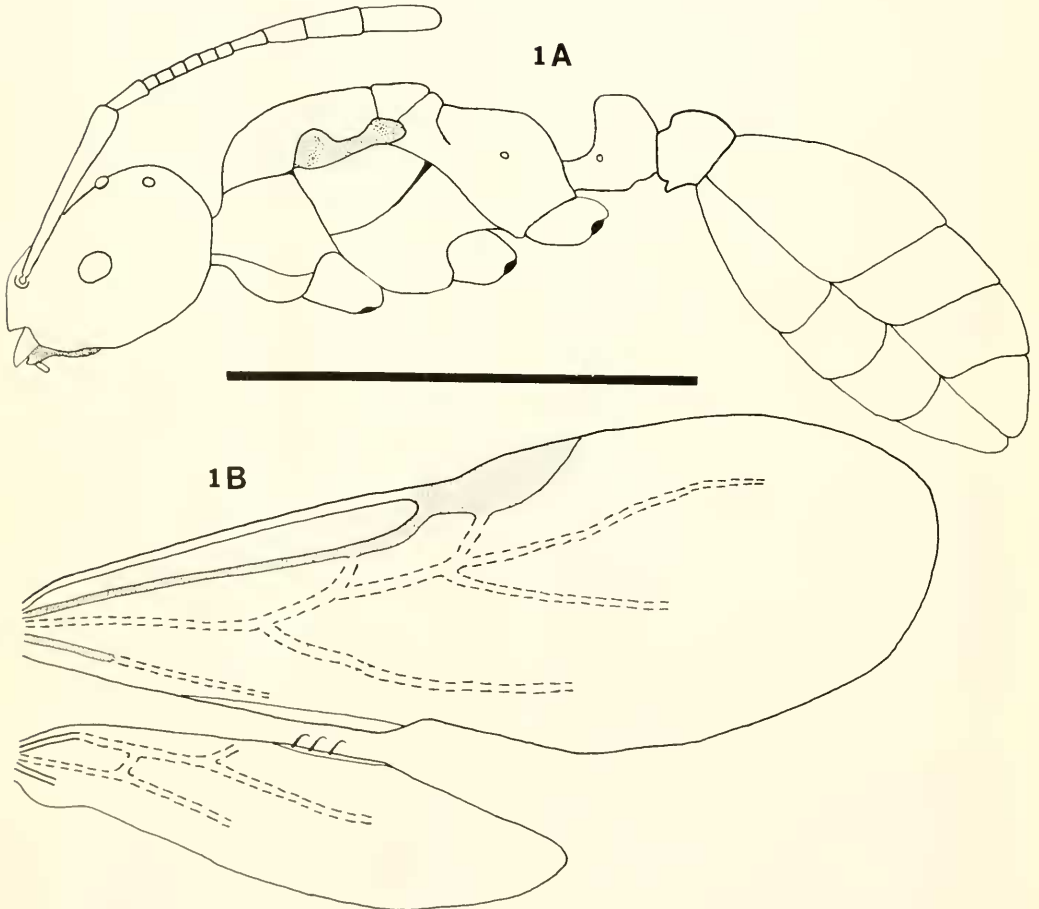


FIGURE 1. *Monomorium talbotae*, female. A. Side view showing outline and major sutures (legs omitted). Stippling indicates membranous areas. B. Wings. Stippling indicates most heavily sclerotized veins. Dashed lines indicate veins represented by lack of microtrichia. Both A and B drawn to same scale. Line equals 1 mm.

Female

Diagnosis.—Similar in general morphology to *M. pergandei* but differing in the following features: clypeus emarginate but lacking distinct carinae or teeth; anterior edge of pronotum rounded in side view vs. angular projecting edge in *M. pergandei* (Figs. 2 and 3); dorsum of petiolar node emarginate. Similar to *M. talbotae* but differing in the following features: first gastral tergum with slight basal depression; metanotum with outline as in Figure 2; dorsum of both petiole and postpetiole emarginate; outline of propodeum as in Figure 2; and dorsum of alitrunk with pilosity of uniform distribution and length.

Description.—Habitus similar to that of *M. pergandei* (Fig. 2). Total length including mandibles 2.16 mm dry. HEAD: Length 0.45 mm; width 0.39 mm; surface smooth and shining; mandible with two teeth; maxillary palp 1-segmented; labial palp 2-segmented; clypeus emarginate but lacking distinct teeth; frontal groove extends to level of anterior ocellus; antenna 12-segmented with weakly developed 3-segmented club. Head and mandibles dark brown, antennae yellow. ALITRUNK: Length 0.66 mm; pronotal width 0.30 mm; surface smooth and shining; propodeal spines absent. Alitrunk dark brown, tibia and tarsi yellow. PETIOLE: Length 0.20 mm; width 0.16 mm; height 0.21 mm; pedunculate; dorsal surface of node emarginate; both anterior and posterior surfaces evenly covered with erect setae; sides of petiole smooth to weakly punctate. Color brown. POSTPETIOLE: Length 0.09 mm; width 0.24 mm; height 0.18 mm; dorsal surface of node emarginate; sides of postpetiole punctate. Color brown. GASTER: Small depression at base of first gastral tergum; surface of gaster smooth and shining. Color brown.

Derivatio nominis

This name is used in reference to the inquilinous way of life of this ant as indicated by the association with *M. cyaneum* and the lack of a worker caste.

Habitat

From notes by W. L. Brown, Jr.: This specimen came from a populous colony of *M. cyaneum* (?) under a rock in plateau semidesert with low shrubs.

*Comparison of
M. inquilinum with its Host*

Monomorium inquilinum has many of the morphological characters found in inquilinous ants (Wilson, 1971) which were discussed with the previous species. Since the holotype lacks wings, it is unknown whether the wing venation is reduced.

In spite of these modifications, *M. inquilinum* appears to be closely related to its host for the following reasons (numbers correspond to previous comparison of *M. talbotae* with its host). 3. The outline of the metanotum, in side view, is similar between *M. inquilinum* and its host. 4. The shape of the propodeum is similar between these two species. 6. The pilosity of both species is similar.

One difference between *M. inquilinum* and its host is that *M. inquilinum* presumably possessed wings as a young female while *M. cyaneum* (?) queens did not (based on the fusion of sclerites). This is difficult to interpret since there is such a small sample of queens of both species from this locality.

Measurements of host queen.—The following measurements were taken from a queen of what is, or is closely related to, *M. cyaneum* collected at the same locality as *M. inquilinum*. Total length including mandibles 4.7 mm dry. HEAD: Length

0.85 mm; width 0.75 mm. ALITRUNK: Length 1.30 mm; pronotal width 0.55 mm. PETIOLE: Length 0.45 mm; width 0.35 mm; height 0.40 mm. POSTPETIOLE: Length 0.20 mm; width 0.40 mm; height 0.35 mm.

Monomorium pergandei LECTOTYPE DESIGNATION

Originally described as *Epoecus pergandei* by Emery (1892, 1895), Ettershank (1966) placed this species in *Monomorium*. Although several museums contain syntypes of this species, the lectotype was selected from specimens in the National Museum of Natural History, since Pergande collected this species, and most of his collection is deposited there.

Lectotype female.—DISTRICT OF COLUMBIA: Washington;7-12/ [Next label illegible, ending in 206]/ No. 53581

U.S.N.M. Cotype/ [Handwritten label] *Epoecus pergandei* (type) Emery.

Lectotype is in good condition possessing all legs, antennae and wings. In addition to this type, the U.S.N.M. contains four paralectotypes (1 badly damaged) and the Museum of Comparative Zoology contains two additional paralectotypes (1 badly damaged). All specimens examined are females and now possess red, handwritten labels indicating lectotype or paralectotype.

KEY TO NORTH AMERICAN INQUILINOUS *Monomorium*

The following key will provide for the separation of all three species of inquilinous *Monomorium* occurring in North America. All these species would key to *Epoecus pergandei* in Creighton (1950).

- 1. Base of first gastral tergum with dorsal impression2

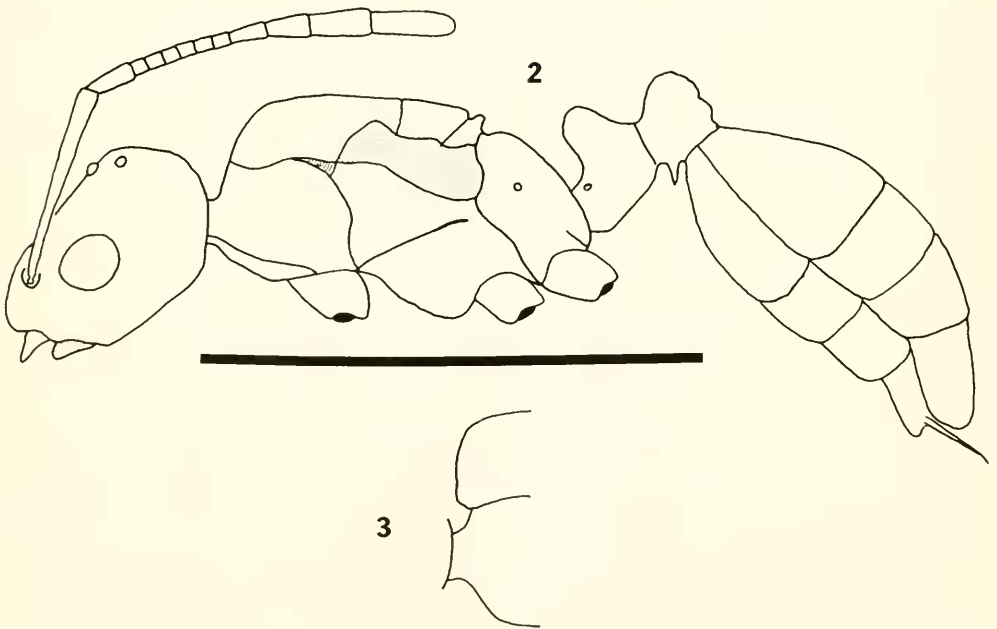


FIGURE 2. *Monomorium inquilinum*, female. Side view showing outline and major sutures (legs omitted). Stippling indicates membranous areas. Line equals 1 mm.

FIGURE 3. *Monomorium pergandei*, female. Side view of anterior prothorax indicating projecting pronotum. Line equals 1 mm.

- Base of first gastral tergum lacking dorsal impression
 *Monomorium talbotae*
2. Anterior edge of pronotum as in Figure 3 *Monomorium pergandei*
- Anterior edge of pronotum as in Figure 2 *Monomorium inquilinum*

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I wish to thank Dr. C. D. Michener for criticizing this manuscript and supplying many useful suggestions, Dr. Mary Talbot for providing specimens of *M. talbotae*, Ms. M. Thayer for supplying *M. inquilinum*, and Drs. R. McGinley (M.C.Z.) and D. R. Smith (National Museum of Natural History) for allowing me to examine the cotypes of *M. pergandei*.

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